Errata

Fowles, **Introduction to Modern Optics**, Second Edition

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This book was chosen for the optics portion of H7C because the selection and relative coverage of topics is excellent. As now reprinted by Dover, it is also bargain priced. For the most part Fowles tells you what you want to know, with brevity and insight. Perhaps more important for a general course like H7C, Fowles usually does not tell you what you do not want to know. This is in contrast to the pricey and encyclopædic Hecht, in which fundamental concept and arcane detail are mixed together without any obvious differentiation.

The main problem with the book is that Fowles, while a good physicist, seems as an author not to be a sufficiently concerned with correctness. The text is full of annoying lapses in accuracy of the drawings. Despite the existence of two editions, the book seems never to have been adequately proof-read or revised.

Therefore, to benefit from this otherwise good book, **you should correct the many errors in your copy**, using this guide.

Page 23, Eq. 2.16 should read

$$H = \frac{nE}{Z_0}\frac{\mu_0}{\mu}$$

Page 25, Eq. 2.23 should read

$$I = \frac{1}{2}E_0 H_0 = \frac{n}{2Z_0}|E_0|^2\frac{\mu_0}{\mu}$$

Page 35, Table 2.1. "Fast axis at $\overset{+}{-}45°$ " should read "Fast axis at $\overset{-}{+}45°$ ".

Page 41, Eqs. 2.49, 2.50, and 2.51: these equations assume that μ is the same in both media.

Page 43 (an omission, not an error). To Eqs. 2.54 and 2.55 should be added:

$$t_s = \frac{2\cos\theta}{\cos\theta + n\cos\phi}$$

$$t_p = \frac{2\cos\theta}{n\cos\theta + \cos\phi}$$

Page 45. The details in Fig. 2.12 are reliable only to a factor of ≈ 2, due to bad registration of the curves (printed in color in the hardcover version) with respect to the axes.

Page 56, Problem 2.23: "Brewster window" should be "Brewster interface", *i.e.* one interface between $n = 1$ and $n = n$.

Page 64, last sentence, beginning "In this case the central fringe...", and continuing onto page 65, should be ignored. This sentence would be correct only if plate A were not (even half) silvered.

Page 75, Fig. 3.13: For your own increased comprehension, indicate the following on the figure: s is the distance between the sources S_a and S_b; l is the distance between the receivers P_1 and P_2; r is the distance between the average of S_a and S_b, and the average of P_1 and P_2.

Page 76, sentence following Eq. 3.39 should read: "... small in comparison with τ_0."

Page 76, sentence preceding Eq. 3.40 should read: "We then have $\tau_b - \tau_a = (r_{2b} - r_{2a})/c$, or approximately"

Page 76, Eq. 3.40 should read:

$$\tau_b - \tau_a \approx \frac{sl}{cr}$$

Page 77, Eq. 3.41 should read:

$$\omega(\tau_b - \tau_a) = \frac{\omega s l_t}{cr} = \pi$$

Page 77, Eq. 3.42 should read:

$$l_t = \frac{r\lambda}{2s}$$

Page 77, Eq. 3.43 should read:

$$l_t = \frac{\lambda}{2\theta_s}$$

Page 97, Fig. 4.7: For consistency with Eqs. 4.23, 4.27, and 4.32, in the [central] region with index n_1 shown in the figure, k_1 and k_1' should be replaced by k and k'.

Page 98, last sentence: add at the end of this sentence ", with $R + n_T T/n_0 = 1$."

Page 137, Fig. 5.28; page 139, Fig. 5.29; and page 143, Fig. 5.32: The patterns should be centered on $y = 0$ or $\nu = 0$ (again a registration problem).

Page 150, Problem 5.16: The last parenthesis should be "(Assume the trailing edge of the moon to be effectively straight.)"

Page 220, 4^{th} sentence should read: "For left circularly polarized light, the direction of spin of the photon is parallel to the direction of propagation, whereas for right circularly polarized light, it is antiparallel to the direction of propagation. [This is a convention that depends on the charge of the particle (electron or positron) to which the photon couples; our (more usual) convention takes that charge to be positive.]"

Page 297, Eq. 10.11 should read:

$$\frac{1}{f} = (n-1)\Big[\frac{1}{r_1} - \frac{1}{r_2} + \frac{(n-1)t}{nr_1r_2}\Big]$$

Page 297, Eq. 10.12 should read:

$$d_2 = -ft\Big(\frac{1-n}{r_1}\Big)$$

assuming that d_1 and d_2 are positive distances as drawn in Fig. 10.3.

Page 298, Fig. 10.3. The rays are so badly drawn as to be meaningless. The top ray should emanate from the object in a direction parallel to the axis, and it should be bent only at principal plane H'. The bottom ray should emanate from the image in a direction parallel to the axis, and it should be bent only at principal plane H.

Page 307, 1^{st} complete sentence should read: "The interference pattern can be made to shift by one fringe *i.e.* from a bright fringe to the adjacent dark fringe, or *vice versa*) by displacing either of the two mirrors M_1 or M_2 a distance of $\frac{1}{4}$ wavelength."